



Core Public Service Vocabulary specification

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1. Introduction

1.1. About the ISA Programme

The Core Public Service vocabulary has been created as part of [Action 1.1](#)¹ of the Interoperability solutions for European public administrations (ISA) programme of the European Commission (EC). This programme funds initiatives to foster the efficient and effective cross-border electronic interactions between European public administrations. Action 1.1 is targeted towards improving the semantic interoperability of European e-Government systems. It addresses these by encouraging the sharing and reuse of semantic assets. As part of Action 1.1, the ISA Programme intends to build consensus on a number of e-Government Core Vocabularies for public sector information exchange.

1.2. Terminology

This document uses the following terminology:

Semantic interoperability is defined as the ability of information and communication technology (ICT) systems and the business processes they support to exchange data and to enable the sharing of information and knowledge: *Semantic Interoperability enables systems to combine received information with other information resources and to process it in a meaningful manner* [5]. It aims at the mental representations that human beings have of the meaning of any given data.

A **Core Vocabulary** is a simplified, reusable, and extensible data model that captures the fundamental characteristics of an entity in a context-neutral fashion [4]. Well known examples of existing Core Vocabularies include the Dublin Core Metadata Set². Such Core Vocabularies are the starting point for agreeing on new semantic interoperability assets and defining mappings between existing assets. Semantic interoperability assets that map to or extend such Core Vocabularies are the *minimum required* to guarantee a level of cross-domain and cross-border interoperability that can be attained by public administrations.

1.3. Objectives

The Core Public Service Vocabulary (**CPSV**) is designed to make it easy to exchange basic information about individual public sector services. By using the vocabulary, almost certainly augmented with sector-specific information, organisations publishing data about their services will enable:

- easier discovery of those services with and between countries;
- easier discovery of the legislation and policies that underpin service provision;

¹ http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action_en.htm

² <http://dublincore.org/documents/dcmi-terms/>

- easier recognition of how services provided by a single organisation interrelate and are used either by other services or external users; and
- easier comparison of similar services provided by different organisations.

1.4. Scope

Any description of a public service will fit into a broader data set; for example: service users, metrics, outcomes, incidents and reports are all concepts likely to impinge on a service. In order to complete the current work in timely fashion, it is necessary to limit the scope and focus specifically on the core aspects of a service, recognising that it must fit in with existing and future vocabularies. That said, the CPSV must be broad enough so that it provides a framework for publishing data that is immediately useful and does not automatically require the addition of terms that would need to be defined in future work.

At its simplest, a public service is the capacity to carry out a procedure and exists whether it is used or not. It is a set of deeds and acts performed by or on behalf of a public agency for the benefit of a citizen, a business or another public agency. Public services operate according to rules that are derived from some combination of legislation and policy which can be set at local, national or supranational level. We further stipulate that a public service:

- is atomic, meaning that its use can be triggered by businesses, citizens or other public administrations; and
- usually requires information that is checked before the public administration issues an official decision that is registered in a system (in an automatic or manual way).

2. Motivation

The **metadata** and **reference data** used in electronic public services across Europe most often has a very specific context. Attaining consensus on common metadata and reference data for these electronic services is a *critical* step towards semantic interoperability. Unfortunately, consensus building is hindered by the diverse cultural, multi-lingual, legal, and organisational contexts of these e-Government services. To alleviate this problem, consensus building should start at a higher level of abstraction that surpasses the contexts of individual electronic public services, and thus the cultural, lingual, legal, and organisational differences of individual countries. In particular, consensus can be more easily attained on the semantics of a *small* set of fundamental concepts, for which less divergent opinions exist [EGOV-CV]. These concepts are what we describe as Core Vocabularies.

2.1. Use cases

The Core Public Service Vocabulary is designed to meet the use cases described below.

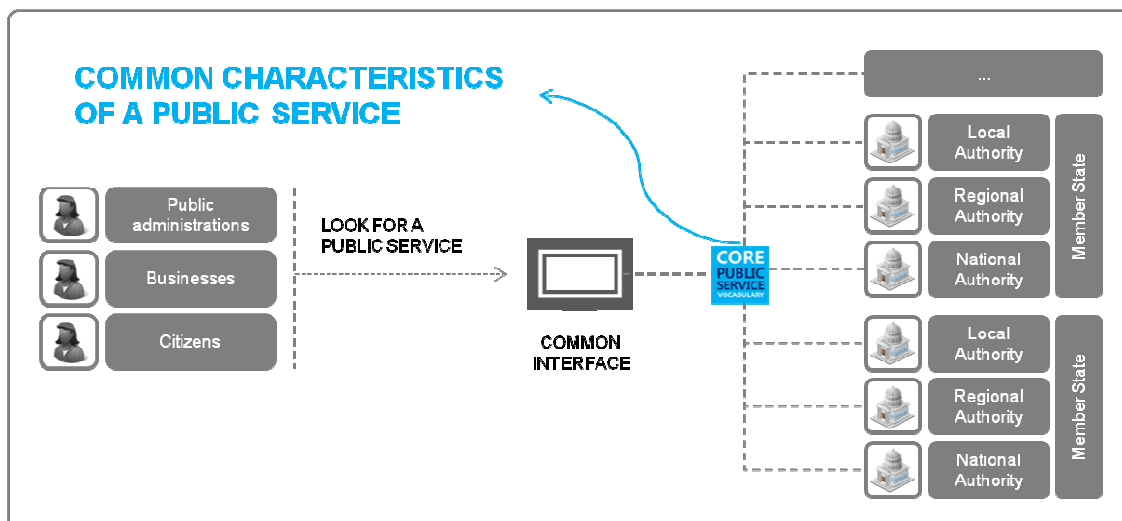


Figure 1 A diagrammatic summary of the use cases for the Core Public Service Vocabulary. The term Member State refers to member states of the European Union and Authority to public administrations at different levels including government bodies.

2.1.1. Use Case 1

Alice, a young woman living in Brighton, is aggrieved that an item of rubbish she left outside her property was not taken away with the rest of her waste by her local domestic refuse collection service. Looking at the authority's Web site she is **able to find details of the service**, including links to the legislation and policies that govern the service. The policy documents make it clear that the item should have been collected. Taking up her case, the local authority is able to

contact the contracted service provider and arrange for the item to be collected.

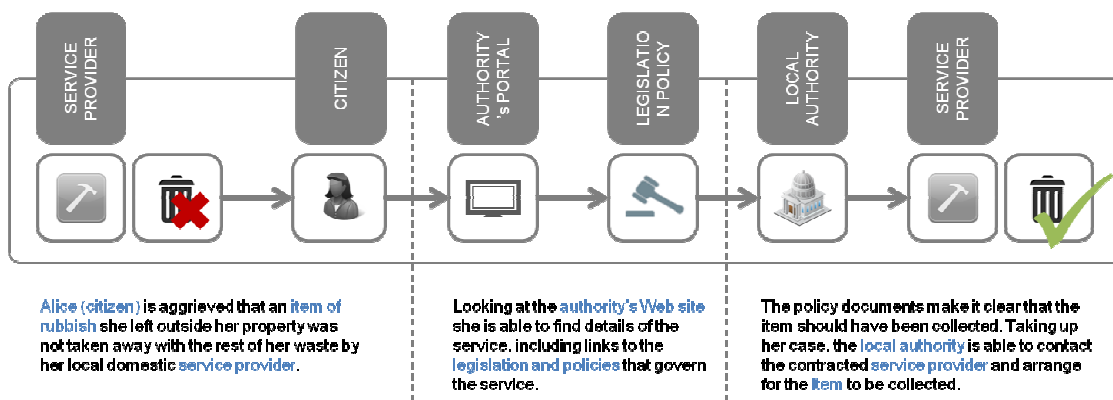


Figure 2 Overview of Use Case 1

2.1.2. Use Case 2

Johann is considering how his department at the Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection is going to fulfil the obligations put on it by new legislation concerning adult social care. To help him formulate a proposal, he wants to see how similar issues are handled in other EU Member States. Referring to a controlled vocabulary of services performed by local governments in several EU Member States, he is able to quickly identify and locate descriptions of the relevant services and so begin his comparative study.

2.1.3. Use Case 3

Pierre is studying the impact of road traffic accidents in the area of Montpellier, France. She is collating data on which services are involved and what the function of each one is. As well as the emergency services, she notes that many accidents lead to assessments of the accident site by departments concerned with highway maintenance, landscaping and health and safety. Since each service is described in a common manner, she is **quickly able to identify the services** concerned with each road traffic accident. It is this commonality that reveals the significant duplication of effort. Clair is therefore able to propose a new, more efficient service that carries out the duplicated functions just once on behalf of multiple services.

2.1.4. Use Case 4

Dimitris is suffering from macular degeneration and is understandably concerned about what services will be available to him as his eyesight deteriorates. Since his local authority's services in Athens are described in a common machine readable manner, he is able to **easily query the service directory** for services tailored for blind or partially sighted people.

2.1.5. Use Case 5

Elena is conducting a review of the impact on schools of legislation passed in the last 5 years. The work is being carried out as part of a review of education policy under a previous

administration. Taking the **legislation** itself as a **starting point**, she is quickly able to see that different education authorities have assigned different functions arising from it to different services. She is then able to group education authorities according to broad categorisations based on their implementations and from there look for any significant differences in outcome and effectiveness and so inform the policy development process.

2.1.6. Use Case 6

Franco works in the environmental protection department of his local authority and needs to find out what help might be available that would help him encourage residents in a troubled housing estate to take greater care of a nearby water course. Consulting the **services directory** he is quickly able to identify the relevant services and the departments responsible for running them.

2.1.7. Use Case 7

Gicela wants to hold a street party so that she and her neighbours can take part in the celebrations for the Queen's Day in The Hague. Clearly doing this requires permission to close off the street to traffic and may also impact on issues such as health and safety, waste disposal, noise control and so on. Putting on the event will require the permission and cooperation of multiple agencies at multiple levels of government: local, regional and possibly national. What Gicela needs is a directory of services that **cuts across administrative boundaries** so that she can direct her enquiries accordingly.

2.1.8. Use Case 8

Hans is a developer who would like to build a Web application that allows users to **match their needs against available public services**, irrespective of the administration that provides them. The application queries each authority's data and presents it to the user. Hans' task is made substantially easier as he knows what data is likely to be available and that it will be consistent between multiple sources.

2.1.1. Use Case 9

Hermann and Jakob are Directors of their automotive electronic components business, "Einstein & Co GmbH" from Munich in Germany for ten years. The board of the company, backed by a shareholder vote, has taken a decision to set up a branch office in Italy. Hermann is charged with formalising the necessary procedures, and establishing the business in Italy. To start with, Hermann needs easily find his way to information about the online Point of Single Contact in Italy, where he can register the business with the relevant Chamber of Commerce, secure the necessary trade certifications, and establish a new business in Italy. He will also need some help with finding the right office, recruiting new colleagues to run Einstein & Co S.p.A. (e.g. information about the Italian labour regulations), and growing the business in Italy.

2.2. Related work

Before embarking on the development of the CPSV, the working group notes, and in many cases draws directly upon, several existing initiatives.

- The UK Public Sector Concept Model [26] and ESD Toolkit's Local Government Business Model [15] offer well developed models that include Public Services.
- A number of service registries already exist, including DG DIGIT's Catalogue of Services [13], Vocabulario de trámites y servicios públicos [35], the Greek Interoperability Centre Service Registry [7], the government service catalogue portal in Brazil [2].
- The German "Nationale Prozessbibliothek" project is centred around a library of services and defines reference data for public services [20].
- A number of controlled vocabularies exist in this space including ESD Toolkit's Service list [29]. In Denmark there is one for state administrations Fælles Offentlig Reference Model (Common Public Administration Reference Model) [9] and another for municipalities KL Emnesystematik (LGDK Subject System) [14].
- OASIS's Transformational Government Framework [32] is a comprehensive effort to advance an overall framework for using information technology to improve the delivery of public services.
- The Government Enterprise Architecture [11, 24] is a set of data and process models to describe public service and public service provision. It has been used for describing public services in a number of different EU Member States including Greece and Cyprus.
- In Spain, the City of Saragossa has published data about all their public services using a basic RDF model, and the government of Andalucia has also modelled part of their service provision likewise using the same vocabulary [3].
- A detailed academic study of the effect of ICT on service provisioning is provided by Jian Yu *et al* [36].
- The core service model for the Web of Services [19].
- Other relevant work includes the W3C eGov Common Service Model use case [34] and the Rural Inclusion Project³.

³ <http://wiki.rural-inclusion.eu/>

3. Conformance Statement

A data interchange, however that interchange occurs, is conformant with the Core Public Service Vocabulary if:

- it uses the terms (classes and properties) in a way consistent with their semantics as declared in this specification;
- it does not use terms from other vocabularies instead of ones defined in this vocabulary that could reasonably be used.

A conforming data interchange:

- may include terms from other vocabularies;
- may use only a subset of Core Public Service Vocabulary terms.

A CPSV application profile is a specification for data interchange that adds additional constraints. Such additional constraints in a profile may include:

- a minimum set of required terms;
- classes and properties for additional terms not covered in the Core Public Service Vocabulary;
- controlled vocabularies or URI sets as acceptable values for properties;

The Core Public Service Vocabulary is technology-neutral and a publisher may use any of the terms defined in this document encoded in any technology although RDF and XML are preferred.

3.1. Multilingual issues

The Core Public Service Vocabulary can operate in any language as:

- All textual fields can be language tagged (see section 4.7).
- The language(s) in which a service is available can easily be specified (section 4.2.4).
- The specification strongly encourages the use of URIs as identifiers and all URIs are 'dumb strings.' Although they clearly make use of English words, they do not convey those words - that is done by the human readable labels which can be multilingual.
- The acronym URI is used throughout the document due to widespread familiarity, however, Internationalised Resource Identifiers (IRIs) are equally usable, and these can use any character in any script⁴.
- Translations of the labels used in the various terms can readily be added to the schema (please contact the working group if you can help with this).

⁴ <http://www.ietf.org/rfc/rfc3987.txt>

4. Core Public Service Conceptual Model

The namespace for this vocabulary is `http://purl.org/vocab/cpsv#` for which the preferred prefix is `cpsv`. Other namespaces used throughout this document are:

Prefix	Namespace
<code>dcterms</code>	<code>http://purl.org/dc/terms/</code>
<code>foaf</code>	<code>http://xmlns.com/foaf/0.1/</code>
<code>skos</code>	<code>http://www.w3.org/2004/02/skos/core#</code>
<code>frbr</code>	<code>http://purl.org/vocab/frbr/core#</code>
<code>org</code>	<code>http://www.w3.org/ns/org#</code>

4.1. Domain model

The model presented in Figure 3 is independent of any technology that may be used to represent it although it uses RDF vocabularies to convey semantics. It describes the minimal set of classes, relationships and properties necessary to describe a public service. All classes and properties are in the CPSV namespace unless otherwise indicated.

At the heart of the model is the public service itself. This will very likely have a name, a description and, in many cases, will be of a specific type. For greatest interoperability, service types should be given as values from a list such as the service list used in many EU countries [29]. The service is likely to be available through multiple channels including a Web site, one or more physical locations and so on. The generic `hasChannel` property links the service to any such `Channel`. CPSV asserts that the well known `foaf:homepage` property is a sub property of `hasChannel` and mints a further sub property `physicallyAvailableAt` which links a service to a `dcterms:Location`. Details of the location(s) can be given using the Location Core Vocabulary [16] or similar. A service will often be made available in multiple languages that can be specified using `dcterms:language`.

A service will usually require some sort of input. In the case of issuing a driving licence this will be evidence that driving test has been passed; many services will require some sort of proof of ID and so on. Likewise, the output will vary depending on the specific service but there will usually be a document or other artefact that is the output. This is not the same as the *outcome*. Drawing on the definitions used in StratML [31], if the service controls all of the necessary inputs and processes, the desired result is an *output*. Likewise, the GEA Public Service Model, distinguishes between public service outcome, output and effect [17, 24]. For example, a driving licence is an output. The outcome (or effect in GEA) is that the new licence holder can drive a vehicle on the public highway. How they do that, which vehicle they drive etc. is beyond the service's remit.

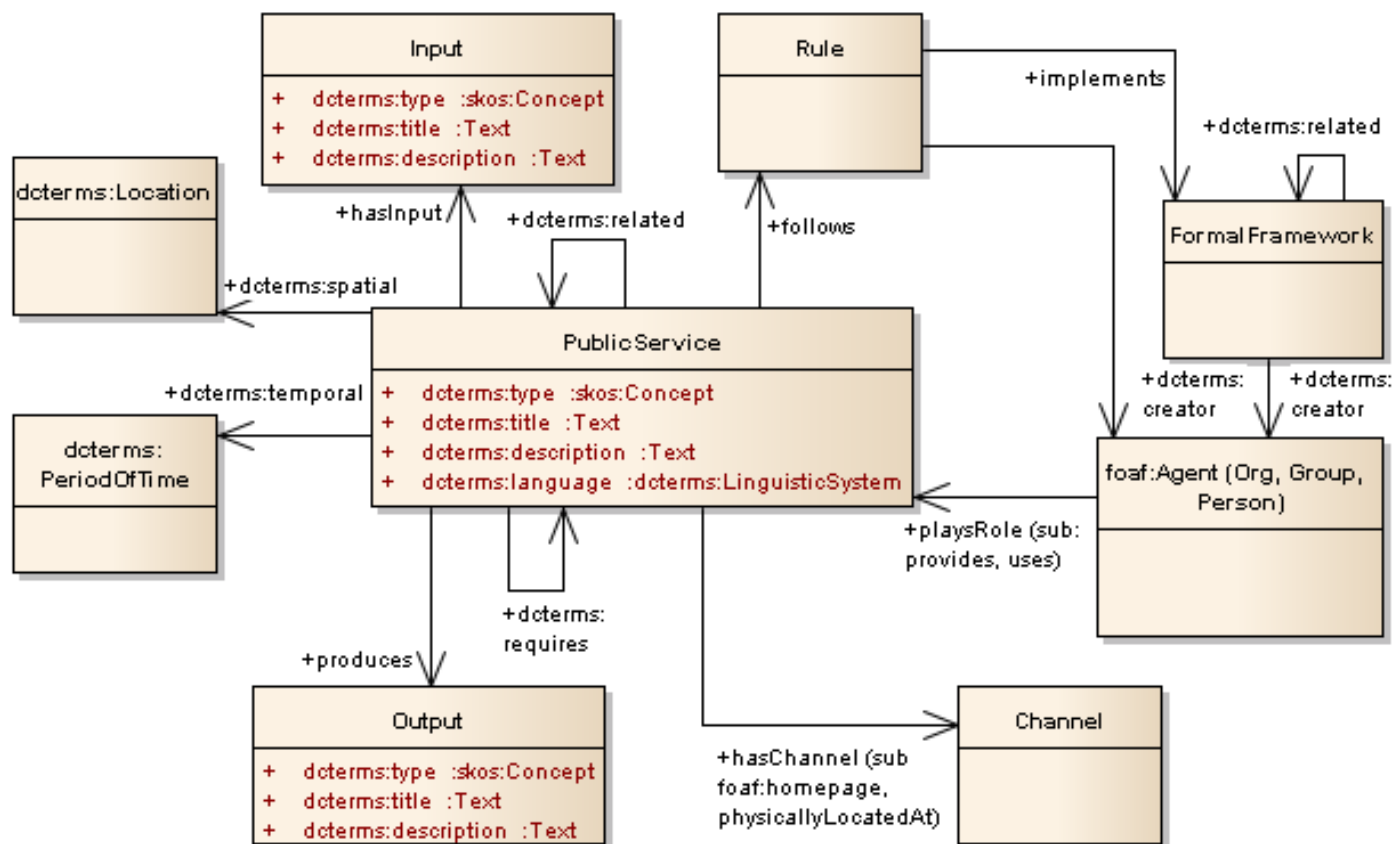


Figure 3 UML diagram for the Core Public Service Vocabulary. All classes and properties are in the CPSV namespace unless otherwise indicated.

Public services are regulated by a set of rules. These will typically be set by a single organisation and will implement combination of legislation and policy, i.e. the rules will sit within a Formal Framework that may be decided at any level from local to supranational by any number of bodies. It is not the task of the CPSV to model detailed relationships between policies and legislation, however, `dcterms:related` may be used to link such items and it is noteworthy that controlled service type lists are themselves likely to offer hints and links to relevant documentation that empowers or requires the provision of the service. The creator(s) of the rules and formal framework are the bodies responsible for their creation, not the individuals who wrote them. It is also notable that the Rule and Formal Framework classes are both subclasses of the FRBR class Expression [10].

An individual service may be related to another in some way, in which case the two services can be linked using `dcterms:related`. If the relationship is such that one service *requires* another then the `dcterms:requires` relationship should be used. The `dcterms:Agent` class represents any individual, group or organisation that plays any role in the service. These include but are not limited to:

- the public administration responsible for providing the service;
- the public administration that defines the rules that regulate the service;
- the organisation(s) that deliver the service on behalf of the responsible public body;
- the public body responsible for passing the legislation or setting the policy or policies from which the rules are derived;
- the person, organisation or group that uses the service.

The basic roles are `provides` and `uses` and specific object properties are provided for these as shortcuts. However there are any number of roles that may be played in the provision or use of a service. Therefore a `hasRole` super property is provided.

Details of the specific role played by an Agent can be provided using the Role and Membership classes defined in the Organization Ontology [21] which in turn derived them from FOAF [8]. It allows for the roles to be defined separately from the agents that fulfil those roles and for any number of agents to be associated with any number of roles.

Finally the service is likely to be available within a defined area and/or time frame. These limits are recorded using the Dublin Core terms `dcterms:spatial` and `dcterms:temporal` together with their respective classes.

A worked example of a description of a public service is provided in section 6.

4.2. The Public Service Class

This class represents the service itself. As noted in the scope (section 1.4), a public service is the capacity to carry out a procedure and exists whether it is used or not. It is a set of deeds and acts performed by or on behalf of a public agency for the benefit of a citizen, a business or another public agency.

The following subsections define the properties of the Public Service class.

4.2.1. `dcterms:title` (data type)

Property	Data Type
<code>name</code>	Text

The name of the service. Language identifiers are particularly important in multilingual contexts where a Service may have more than one name (see section 4.7)

4.2.2. `dcterms:description` (data type)

Property	Data Type
<code>description</code>	Text

A free text description of the service. Language identifiers are particularly important in multilingual contexts where a Service may be described in multiple languages.

The description is likely to be the text that potential users of the service see in any catalogue. Publishers are encouraged to include a reasonable level of detail in the description therefore, including basic eligibility requirements. Formal eligibility requirements and other details will be provided in the Rules (section 4.4)

4.2.3. `dcterms:type` (object type)

Property	Range
<code>dcterms:type</code>	<code>rdfs:Resource</code>

The type of service as described in a controlled vocabulary, typically encoded as a SKOS Concept Scheme, such as ESD Toolkit's Service List [29] or INSPIRE's code list of "Utility and Governmental Services" available in the technical guidelines [30].

4.2.4. `dcterms:language` (object type)

Property	Range
<code>dcterms:type</code>	<code>dcterms:LinguisticSystem</code>

The language(s) in which the service is available. Recommended best practice is to give URIs as values for this property, in particular, the European Publications Office's Named Authority List of languages. This provides URIs for all languages recognised in ISO-639-3, for example <http://publications.europa.eu/resource/authority/language/POR> (Portuguese) and provides labels in the 23 official languages of the EU [37].

4.2.5. hasChannel (object type)

Property	Range
hasChannel	Channel

This property links the Public Service to any `Channel` through which an agent provides, uses or otherwise interacts with the service. It is a super property of `foaf:homepage` and `physicallyLocatedAt`. Further sub properties with more specific semantics may readily be defined such those that would link to proprietary platform applications, phone lines etc.

4.2.6. foaf:homepage (object type)

Property	Range
foaf:homepage	foaf:Document

The Web page through which the service may be available. This may be, but in many cases will not be, the homepage of the service provider. CPSV asserts that `foaf:homepage` is a sub property of `hasChannel`.

It is noteworthy that online access to public services is itself likely to be subject to a variety of policies that typically cut across many departments. Accessibility issues are usually part of such frameworks as well as metadata provision, site structure and so on. These features are an important part of a public authority's online provision but are out of scope of the Core Public Service Vocabulary. The object of the `foaf:homepage` property would be the subject of a description of the online features as opposed to the Public Service itself.

4.2.7. physicallyAvailableAt (object type)

Property	Range
physicallyAvailableAt	dcterms:Location

This property links a Public Service to a physical location at which a user may interact with it.

Like `foaf:homepage`, it is defined as a sub property of `hasChannel`. It performs a similar role to the Good Relations ontology's `gr:availableAtOrFrom` [12] but without restricting the domain so that it may be used in other contexts.

The location itself can be described, for example, using the Location Core Vocabulary [16] and may also include details such as office opening hours, accessibility information about the site etc.

4.2.8. `dcterms:requires` (object type)

Property	Range
<code>dcterms:requires</code>	<code>rdfs:Resource</code>

One public service may require or in some way make use of another. The nature of the requirement will be described in the associated `Rule`.

4.2.9. `hasInput` (object type)

Property	Range
<code>hasInput</code>	<code>Input</code>

The `hasInput` property links a `Public Service` to one or more instances of the `Input` class (see below). A specific service may require the presence of certain inputs or combinations of inputs in order to operate. These should be described in an application profile for a given service.

4.2.10. `produces` (object type)

Property	Range
<code>produces</code>	<code>Output</code>

The `produces` property links a `Public Service` to one or more instances of the `Output` class (see section 4.3).

4.2.11. `follows` (object type)

Property	Range
<code>follows</code>	<code>Rule</code>

The `follows` property links a `Public Service` to the `Rule(s)` under which it operates. The definition of the `Rule` class is very broad (section 4.4). In a typical case, the public authority that

provides the service (section 4.6.1) will also define the rules that will implement its own policies that will have been set within the broader legislative framework but the model is flexible to allow for significant variation in such a scenario.

The domain of `follows` is not restricted so that it could be used for activities other than Public Services.

4.2.12. `dcterms:spatial`, `dcterms:temporal` (object type)

Property	Range
<code>dcterms:spatial</code>	<code>dcterms:Location</code>
<code>dcterms:temporal</code>	<code>dcterms:PeriodOfTime</code>

A service is likely to be available only within a given area, typically the area covered by a particular public authority; and/or within certain time periods such as the winter months. These limits on the availability of the service are described using the established Dublin Core properties and classes. A common usage of `dcterms:spatial` will be to define the country in which a service is available. The Publications Office of the European Union offers a URI set⁵ that is suitable for this purpose, e.g. Malta is identified by `http://publications.europa.eu/resource/authority/country/MLT`

N.B. These restrictions are not meant to be used to describe *eligibility* or the speed of operation of the service. These aspects will be covered by the `Rule`.

4.3. The Input and Output Classes

`Inputs` and `Outputs` can be any resource - document, artefact - anything. This is in line with, for example, StratML which defines an input as "A resource to be processed to produce an output." and an output as "An intended result whose required inputs and processes are entirely within the control of the planning organisation." [31]. In a specific context it is likely to be useful to either define a sub class or declare the particular resource to be an instance of another class as well as being a `cpsv:Input` or `cpsv:Output`. A general case might be a `foaf:Document` but where possible, it is better to refer to a controlled vocabulary of types. `dcterms:type` should be used to use to provide this information and, in RDF implementations, it should link to a SKOS Concept [28].

In some cases, the `Output` of one service will be an `Input` to another service. Such relationships should be described in the associated `Rule(s)`.

⁵ <http://open-data.europa.eu/open-data/data/dataset/2nM4aG8LdHG6RBMumfkNzQ>

4.4. The Rule Class

The `Rule` class represents a document that sets out the specific rules, guidelines or procedures that the Public Service follows. It includes the terms of service, licence, and authentication requirements of the service. Instances of the `Rule` class are FRBR Expressions, that is, a concrete expression, such as a document, of the more abstract concept of the rules themselves [10]. Rules are used for validating the input required by the service, deciding on the eligibility of the user, steering the service process and defining the dependencies/relationships between services [17, 18]. The CPSV does not envisage instances of the `Rule` class as machine-processable business rules.

Rules should be linked to the organisation that is responsible for them via the usual `dcterms:creator` property.

4.4.1. implements (object type)

Property	Range
<code>implements</code>	<code>FormalFramework</code>

The `implements` property links a `Rule` to relevant legislation or policy documents i.e. the formal framework under which the rules are defined - see below.

4.5. The FormalFramework Class

This class represents the legislation, policy or policies that lie behind the rules that govern the service. As with the `Rule` class, the `Formal Framework` class is a sub class of `frbr:Expression`, i.e. instances of the class are concrete expressions of the more abstract concept of the piece of legislation or policy itself.

The European Council's invitation to introduce the European Legislation Identifier [6] and portals such as legislation.gov.uk are relevant in this context. Adding `/data.xml` or `/data.rdf` to any legislation URI on legislation.gov.uk will reveal how this can be done, for example <http://www.legislation.gov.uk/uksi/2012/3170/contents/made{/data.rdf or /data.xml}>. Dublin Core provides the necessary properties for describing the legislation or policy, including `dcterms:creator` to link it to the public body responsible for it.

4.6. The Agent Class

The `Agent` class, defined Dublin Core and FOAF, is any resource that acts or has the power to

act. Its well known sub classes are `foaf:Person`, `foaf:Group` and `foaf:Organization`. The latter is re-used in the Organization Ontology which provides further sub classes, such as Registered Organisation [22] (which constitutes the evolution of the Core Business Vocabulary's legal entity [23]).

4.6.1. `playsRole`, `provides`, `uses` (object type)

Property	Range
<code>playsRole</code>	
<code>provides</code>	Public Service
<code>uses</code>	

`playsRole` is a very general property that links an `Agent` to a `Public Service` in which it plays some role. Both `provides` and `uses` are sub properties of `playsRole` with specific semantics.

The `provides` property links an `Agent` to a `Public Service` for which it is responsible. Whether it provides the service directly or outsources it is not relevant, the `Agent` that provides the service is the one that is ultimately responsible for its provision.

The `uses` property links an `Agent` to a `Public Service` in which it plays the specific role of user, meaning that it provides the input and receives the output but does not play any direct role in providing the service. This will typically be an individual citizen or an outside organisation.

Other simple relationships between an `Agent` and a `Public Service` can be described using sub properties of these three. Where n-ary relationships exist between `Agents`, `Public Services` and `Roles`, the Organization Ontology's `Membership` and `Role` classes can be used to provide more detail [21].

4.7. The Text Data Type

The text data type is a combination of a string and a language identifier. It is useful for names and descriptions that are available in multiple languages. Where this is so, each version of the data should be included and each one associated with the relevant language identifier. RFC 3066 [27] provides a commonly used set of identifiers for natural languages. This is the set



recognised by UN/CEFACT and XML Schema.

Languages are represented by ISO 3166-1 Alpha 2 codes (e.g. "de" for German), optionally followed by a locale definition such as "-AT" meaning "German as spoken in Austria."

5. Evaluation of Use Cases

Section 2.1 sets out a number of use cases. Here, we examine whether those use cases have been met by the vocabulary.

Use case 1 centres on discovering who is responsible for a particular service. The user is able to discover who is responsible for a service as the cpsv:provides property links the relevant Agent to the service. Furthermore, the relevant legislation is also discoverable which was also important in this use case.

Use case 2 concerns discovering existing public services of a particular type. The vocabulary's recommendation to use a controlled service type list is the key to meeting this use case and is fully supported.

Use case 3 goes beyond the scope of the Core Public Service Vocabulary, however, the basic function of being able to identify the relevant services is supported and it is this discoverability that is at the heart of the use case.

Use case 4 concerns access to services for people with disabilities. As discussed in section 4.2.6 online services are very often covered by policies that apply to online communications irrespective of the nature of those communications and the Web interface for a Public Service will be governed by those policies. Likewise, accessibility of physical locations at which a Public Service is available is a feature of the location, not of the service. This is highlighted in section 4.2.7. Taking these factors into account, use case 4 is not directly met by the CPSV but efforts have been made nonetheless to ensure that users of the CPSV include a description of the accessibility features of a given public service.

Use case 5 takes legislation as the starting point and then discovers the public services that implement it. The links between a Public Service and one or more pieces of relevant legislation are well represented in the vocabulary.

Use case 6 is focussed on a specific area. The geographic coverage of Public Services can be recorded using the CPSV and this would be helpful in this use case. As with use case 1, however, the key element though is the service type. It is this that is most likely to be helpful in use case 6.

Use case 7 is covered squarely since the CPSV facilitates the development of exactly the kind of services directory envisaged.

Use case 8 requires the same kind of data used in use case 7 but for it to be machine readable rather than presented to an end user on a screen so that software applications can do more of the work. The CPSV provides the necessary framework for the provision of such machine readable data.

Use case 9 concerns easy access to information about opening up a new business in another country. It is a typical case of a cross-border e-Government service. The Core Public Service Vocabulary can effectively support this use case as the basic function of being able to identify the relevant services is supported and it is this discoverability that is at the heart of the use case. Furthermore, the relevant legislation is also discoverable which was also important in this use case.

6. Example

The following example shows real data about the Provision of Architectural Services on a Temporary or Occasional basis in Lithuania. The data was originally supplied by the SPOCS project⁶.

The first block of data describes the Public Service itself which has:

- a title;
- a description;
- its type (according to the ESD Toolkit Service List);
- its spatial coverage (Lithuania);
- the service homepage;
- the document that describes the procedure followed by the service in human readable form, including eligibility requirements (which in this case is also the service homepage);
- a list of necessary inputs;
- the output of the service.

In this case, the service homepage is also an instance of the document that describes the rules under which the service operates so that the same URI is given as the value for both `foaf:homepage` and `cpsv:follows`. That URI is therefore an instance of both a `foaf:Document` (inferred from the range of `foaf:homepage`) and a `cpsv:Rule` (section 4.4).

```
<http://cpsv.testproject.eu/id/ltu/PublicService/ArchitectRegistration>  
  a cpsv:PublicService ;  
  dcterms:title "Provision of Architectural Services on a Temporary or  
    Occasional basis in Lithuania"@en ;  
  dcterms:description ""The procedure of the recognition of  
    professional qualifications of Architect pursuant to the occasional  
    or temporary provision of architectural services in the Republic  
    of Lithuania.
```

```
  Authorisation is needed for Architects from other EU member states  
  for the provision of architectural Services on a temporary or  
  occasional basis. Upon successful completion of the requirements,  
  List of Architects who can provide Architectural Services on a  
  temporary or occasional basis will be publicly available on the  
  site of Ministry of Environment of the Republic of  
  Lithuania""@en ;
```

⁶ http://www.eu-spocs.eu/index.php?option=com_processes&task=streamFile&id=18&fid=1241

```
dcterms:type <http://id.esd-toolkit.eu/service/1181> ;
dcterms:spatial
  <http://publications.europa.eu/resource/authority/country/LTU> ;
foaf:homepage <http://www.verslovartai.lt/en/regulations/provision-
of-architectural-services-on-a-temporary-or-occasional-basis-in-
lithuania/160585/> ;
cpsv:follows <http://www.verslovartai.lt/en/regulations/provision-
of-architectural-services-on-a-temporary-or-occasional-basis-in-
lithuania/160585/>;
cpsv:hasInput
  <http://cpsv.testproject.eu/id/ltu/ProofOfNationality> ,
  <http://cpsv.testproject.eu/id/ltu/LegalEstablishment> ,
  <http://cpsv.testproject.eu/id/ltu/ProofOfFormalQualifications> ,
  <http://cpsv.testproject.eu/id/ltu/CertificateOfEconomicActivity> ,
  <http://www.verslovartai.ltu/uploads/file/lt-architect-temp-
services-application-form-v0-46p.pdf> ;
cpsv:produces
<http://cpsv.testproject.eu/id/ltu/Output/TemporaryArchitectRegistration> .
```

Further blocks of data describe the various elements pointed to be the initial data, beginning with the Rule for which we know:

- the title;
- the creator;
- the list of legislation that the Rule implements.

```
<http://www.verslovartai.ltu/en/regulations/provision-of-
architectural-services-on-a-temporary-or-occasional-basis-in-
lithuania/160585/>
  a cpsv:Rule;
dcterms:title "Provision of Architectural Services on a Temporary or
Occasional basis in Lithuania"@en;
dcterms:creator <http://www.am.ltu/org>;
cpsv:implements
  <http://cpsv.testproject.eu/id/ltu/FormalFramework/AM_PROTECH_ARC_01> ,
  <http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=342511> ,
  <http://eur-
lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0022:0142:EN:PDF> ,
  <http://www3.lrs.ltu/pls/inter3/dokpaieska.showdoc_l?p_id=328107>.
```

We can say more about the organisation that created the Rule:

- that it is an instance of the ORG Ontology's `FormalOrganization` class;
- its name;

- its homepage;
- its type (according to the ADMS [1] publisher type vocabulary);
- that it provides the service.

```
<http://www.am.ltu/org> a org:FormalOrganization ;
  foaf:name "Ministry of Environment of the Republic of Lithuania" ;
  foaf:homepage <http://www.am.lt> ;
  cpsv:provides
    <http://cpsv.testproject.eu/id/ltu/PublicService/ArchitectRegistration> ;
  dcterms:type <http://purl.org/adms/publishertype/NationalAuthority>.
```

The data also includes information about the 4 pieces of legislation that the Rule implements, that is, the formal framework in which it operates (see section 4.5).

```
<http://cpsv.testproject.eu/id/ltu/FormalFramework/AM_PROTECH_ARC_01>
  a cpsv:FormalFramework ;
  dcterms:title "RESOLUTION ON THE PROFESSIONAL RECOGNITION OR
TEMPORARY OR OCCASIONAL PROVISION OF ARCHITECT SERVICES IN
LITHUANIA"@en ;
  dcterms:description ""Authorisation is needed for Architects from
other EU member states for the provision of architectural Services on
a temporary or occasional basis. Upon successful completion of the
requirements, List of Architects who can provide Architectural
Services on a temporary or occasional basis will be publicly available
on the site of Ministry of Environment of the Republic of
Lithuania.""@en .
```

```
<http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=342511>
  a cpsv:FormalFramework ;
  dcterms:title "Republic Of Lithuania Law On The Recognition Of
Regulated professional Qualifications"@en .
```

```
<http://eur-
lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0022:0142:EN:
PDF>
  a cpsv:FormalFramework ;
  dcterms:title "Directive 2005/36/EC of the European Parliament and
of the Council on the recognition of professional qualifications"@en.
```

```
<http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=328107>
  a cpsv:FormalFramework ;
  dcterms:title "Order No D1-507 by the Minister of Environment of the
Republic of Lithuania of 29 September 2008 on the Procedure for the
Recognition of the Professional Qualifications of Architect for the
```

pursuit of the professional activities of an architect or the provision of architect's services on a temporary or occasional basis in the Republic of Lithuania (Official Gazette, 2004, No 55-1916; 2008, No 114-4373) (LT)"@en .

The (human readable) rules stipulate that a number of inputs are required and the data includes details of these. In each case, the type of input is specified using the `dcterms:type` property linked to a controlled vocabulary of such types.

```
<http://cpsv.testproject.eu/id/ltu/ProofOfNationality>  
  a cpsv:Input ;  
  dcterms:type  
    <http://cpsv.testproject.eu/spocs/def/InputType/Certificate> ;  
  dcterms:title "Proof of nationality"@en ;  
  dcterms:description "Proof of the nationality of the person  
concerned."@en .
```

```
<http://cpsv.testproject.eu/id/ltu/LegalEstablishment>  
  a cpsv:Input ;  
  dcterms:type  
  <http://cpsv.testproject.eu/spocs/def/InputType/Certificate> ;  
  dcterms:title "Proof of legal establishment"@en ;  
  dcterms:description "Certificate stating that the holder is legally  
established in a Member State for the purpose of pursuing the  
activities concerned and that he is not prohibited from practicing,  
even temporarily."@en .
```

```
<http://cpsv.testproject.eu/id/ltu/ProofOfFormalQualifications>  
  a cpsv:Input ;  
  dcterms:type  
    <http://cpsv.testproject.eu/spocs/def/InputType/Certificate> ;  
  dcterms:title "Proof of formal qualifications"@en ;  
  dcterms:description "Proof of formal qualifications."@en .
```

```
<http://cpsv.testproject.eu/id/ltu/CertificateOfEconomicActivity>  
  a cpsv:Input ;  
  dcterms:type  
    <http://cpsv.testproject.eu/spocs/def/InputType/Certificate> ;  
  dcterms:title "Certificate of economic activity"@en ;  
  dcterms:description "Certificate stating that the holder has been  
effectively and lawfully engaged in the architect professional  
activities for at least three consecutive years during the five years  
preceding the award of the certificate."@en .
```

```
<http://www.verslovartai.lt/uploads/file/lt-architect-temp-services-
application-form-v0-46p.pdf>
  a cpsv:Input ;
  dcterms:type <http://cpsv.testproject.eu/spocs/def/InputType/Form> ;
  dcterms:title "Architect Registration Declaration Form"@en .
```

Finally, we're able to describe the output of the service which is of two types (again according to a controlled vocabulary).

```
<http://cpsv.testproject.eu/id/ltu/Output/TemporaryArchitectRegistrati
on>
  a cpsv:Output ;
  dcterms:type
    <http://cpsv.testproject.eu/spocs/def/Output/Registration> ,
    <http://cpsv.testproject.eu/spocs/def/Output/Licence> ;
  dcterms:title "Permission for Temporary Provision of Architect's
Services"@en ;
  dcterms:description "A list of Architects which can provide
Architectural Services on a temporary or occasional basis will be
publicly available on the site of Environment Ministry of Republic of
Lithuania http://www.am.lt (special link for the list of Architects
will be provided)"@en .
```

7. Core Public Service Vocabulary in RDF

7.1. Namespace

The namespace for the Core Public Service Vocabulary is <http://purl.org/vocab/cpsv#> and the preferred prefix is `cpsv`.

7.2. RDF Schema

The Turtle [33] serialisation of the RDF schema for the vocabulary is included below (namespace declarations have been omitted for clarity).

```
<http://purl.org/vocab/cpsv> a owl:Ontology, adms:SemanticAsset;
  dcterms:title "Core Public Service Vocabulary"@en;
  dcterms:description "The Core Public Service Vocabulary (CPSV) is
  designed to make it easy to exchange basic information about the
  functions carried out by the public sector and the services in which
  those functions are carried out."@en;
  dcterms:created "2013-02-06"^^xsd:date;
  dcterms:modified "2013-03-10"^^xsd:date;
  vann:preferredNamespacePrefix "cpsv";
  foaf:homepage
<http://joinup.ec.europa.eu/asset/core_public_service/description>;
  dcterms:publisher [foaf:name "European Commission"];
  dcterms:creator [foaf:name "Core Public Service Working Group";
foaf:homepage
<http://joinup.ec.europa.eu/asset/core_public_service/document/core-
public-service-working-group>];
  dcterms:type <http://purl.org/adms/assettype/Ontology>;
  dcterms:status <http://purl.org/adms/status/UnderDevelopment>.

# classes

cpsv:PublicService a rdfs:Class, owl:Class;
  rdfs:label "Public Service"@en;
  rdfs:comment "This class represents the service itself. As noted in
the scope (section 1.4), a public service is the capacity to carry out
a procedure and exists whether it is used or not. It is a set of deeds
and acts performed by or on behalf of a public agency for the benefit
of a citizen, a business or another public agency."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:Input a rdfs:Class, owl:Class;
  rdfs:label "Input"@en;
  rdfs:comment "Inputs can by any resource - document, artefact -
anything. In a specific context it is likely to be useful to either
define a sub class or declare the particular resource to also be of
another type as well. A general case might be a foaf:Document but
where possible, it is better to refer to a controlled vocabulary of
types. dcterms:type should be used to use to provide this information
linking to a SKOS Concept."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:Output a rdfs:Class, owl:Class;
  rdfs:label "Output"@en;
  rdfs:comment "Outputs can by any resource - document, artefact -
anything. In a specific context it is likely to be useful to either
define a sub class or declare the particular resource to also be of
another type as well. A general case might be a foaf:Document but
where possible, it is better to refer to a controlled vocabulary of
types. dcterms:type should be used to use to provide this information
linking to a SKOS Concept."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:Rule a rdfs:Class, owl:Class;
  rdfs:subClassOf frbr:Expression;
  rdfs:label "Rule"@en;
  rdfs:comment "The Rule class represents a document that sets out the
specific rules, guidelines or procedures that the Public Service
follows. Instances of the Rule class are FRBR Expressions, that is, a
concrete expression, such as a document, of the more abstract concept
of the rules themselves."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:FormalFramework a rdfs:Class, owl:Class;
  rdfs:subClassOf frbr:Expression;
  rdfs:label "Formal Framework"@en;
  rdfs:comment "This class represents the legislation, policy or
policies that lie behind the rules that govern the service. As with
the Rule class, the Formal Framework class is a sub class of
frbr:Expression, i.e. instances of the class are concrete expressions
of the more abstract concept of the piece of legislation or policy
itself."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:Channel a rdfs:Class, owl:Class;
  rdfs:label "Channel"@en;
  rdfs:comment "Any Channel through which an agent provides, uses or
otherwise interacts with another resource."@en;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.

# properties (all of which are object type properties)

cpsv:hasChannel a rdf:Property, owl:ObjectProperty;
  rdfs:label "has channel"@en;
  rdfs:comment "This property links a Resource to any Channel through
which an agent provides, uses or otherwise interacts with it. It is a
super property of foaf:homepage and cpsv:physicallyLocatedAt. Further
sub properties with more specific semantics may readily be defined
such those that would link to proprietary platform applications, phone
lines etc."@en;
  rdfs:range cpsv:Channel;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
  # Domains and ranges are not defined for this very generic property.

foaf:homepage rdfs:subPropertyOf cpsv:hasChannel.

cpsv:physicallyAvailableAt a rdf:Property, owl:ObjectProperty;
  rdfs:label "physically available at"@en;
  rdfs:comment "This property is designed to link a Public Service to
a physical location at which a user may interact with it. Defined as a
sub property of hasChannel, its domain is not restricted so that it
may be used in other contexts."@en;
  rdfs:range dcterms:Location;
  rdfs:subPropertyOf cpsv:hasChannel;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.

cpsv:hasInput a rdf:Property, owl:ObjectProperty;
  rdfs:label "has input"@en;
  rdfs:comment "Links a Public Service to one or more instances of the
Input class. A specific service may require the presence of certain
inputs or combinations of inputs in order to operate. These should be
described in an application profile for a given service."@en;
  rdfs:range cpsv:Input;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
  # No domain defined as this would hinder re-use of the property
unnecessarily.
```



```
cpsv:produces a rdf:Property, owl:ObjectProperty;
  rdfs:label "produces"@en;
  rdfs:comment "Links a Public Service to one or more instances of the
Output class which is its range."@en;
  rdfs:range cpsv:Output;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
  # No domain defined as this would hinder re-use of the property
unnecessarily.
```

```
cpsv:implements a rdf:Property, owl:ObjectProperty;
  rdfs:label "implements"@en;
  rdfs:comment "Links a Rule to relevant legislation or policy
documents i.e. the formal framework under which the Rules are
defined."@en;
  rdfs:domain cpsv:Rule;
  rdfs:range cpsv:FormalFramework;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:hasRole a rdf:Property, owl:ObjectProperty;
  rdfs:label "has role"@en;
  rdfs:comment "This very general property links an Agent to a Public
Service in which it plays some role. Its is a super property of both
cpsv:provides and cpsv:uses."@en;
  rdfs:domain dcterms:Agent;
  rdfs:range cpsv:PublicService;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:provides a rdf:Property, owl:ObjectProperty;
  rdfs:label "provides"@en;
  rdfs:comment "Links an Agent to a Public Service for which it is
responsible. Whether it provides the service directly or outsources it
is not relevant, the Agent that provides the service is the one that
is ultimately responsible for its provision."@en;
  rdfs:subPropertyOf cpsv:hasRole;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

```
cpsv:uses a rdf:Property, owl:ObjectProperty;
  rdfs:label "uses"@en;
  rdfs:comment "Links an Agent to a Public Service in which it plays
the specific role of user, meaning that it provides the input and
receives the output but does not play any direct role in providing the
service. This will typically be an individual citizen or an outside
organisation."@en;
  rdfs:subPropertyOf cpsv:hasRole;
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```



```
cpsv:follows a rdf:Property, owl:ObjectProperty;  
  rdfs:label "follows"@en;  
  rdfs:comment "Links a Public Service to the Rule(s) under which it  
operates."@en;  
  rdfs:domain cpsv:PublicService;  
  rdfs:isDefinedBy <http://purl.org/vocab/cpsv>.
```

8. Approach & Community

The process and methodology followed in the development is set out in detail in the Process and Methodology for Developing Core Vocabularies [25].

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- Fergal Marrinan, Consultant at European Business Registry
- Marios Meimaris, NTUA
- Vassilis Michalitsis, Informatics Development Agency Ministry of Administrative Reform and eGovernance
- Nadežda Nikšová, eGovernment Department - Information Society Division - Ministry of Finance of the Slovak Republic
- Adegboyega Ojo , DERI/NUIG
- Agis Papantoniou, NTUA
- Andrea Perego, JRC/INPSIRE
- Vassilios Peristeras, DG DIGIT
- Børge Samuelsen, Local Government Denmark.
- Sebastian Sklarß, Jinit[
- Mari Carmen Suárez de Figueroa Baonza, Universidad Politecnica de Madrid
- Mike Thacker, ESD
- Bruno Thuillier, Pôle Numérique
- Erik Tilburgh, DG DIGIT
- Vassilios Tountopoulos , ATC
- Eddy Vanderlinden, fadyart.com
- Carlos Veira, Ministério do Planejamento, Orçamento e Gestão
- Neven Vrček, University of Zagreb
- Peter Winstanley, Scottish Government

8.1. Change Control

The Core Public Sector Vocabulary is published by the ISA Programme. Review comments and requests for changes can be made via the mailing list which is archived at http://joinup.ec.europa.eu/mailman/archives/core_public_service/.

8.2. Future work

A number of pilots/test implementations are planned in the near future, realising a number of CPSV's use cases. Feedback from these activities may, of course, lead to revisions of the vocabulary.

Towards this direction, the ISA programme is piloting the Core Public Sector Vocabulary using public service descriptions produced by the Large Scale Pilots, e.g. SPOCS⁷, STORK⁸ and PEPPOL⁹.

The pilot¹⁰ has the following objectives:

- To demonstrate that the Core Public Service Vocabulary can be used as a foundational RDF Vocabulary to **homogenise public service data**;
- To **inform the Working Group** about possible extensions and / or modifications to the Core Public Service Vocabulary;
- To identify suitable **controlled vocabularies** to facilitate the search for public services; and
- To demonstrate that a **linked data infrastructure** can provide access to *homogenised, linked, and enriched* public service data using standard Web-based interfaces (such as HTTP and SPARQL) and Web-based languages.

The pilot is accessible online at <http://cpsv.testproject.eu/CPSV/>.

⁷ <http://www.eu-spocs.eu/>

⁸ <https://www.eid-stork.eu/>

⁹ <http://www.peppol.eu/>

¹⁰ https://joinup.ec.europa.eu/asset/core_public_service/document/core-public-service-pilot-linking-public-service-descriptions

References

1. The Asset Description Metadata Schema, Available at:
<http://joinup.ec.europa.eu/asset/adms/description>
2. gov.br Serviços, Available at: <http://www.servicos.gov.br/>
3. Example of Zaragoza records exposed in RDF, Available at:
<http://www.zaragoza.es/datosabiertos/id/infraestructuras/servicios/Procedimiento/6001>.
This uses the vocabulary developed by CTIC at
<http://data.fundacionctic.org/vocab/infraestructuras/servicios.html>
4. e-Government Core Vocabularies: The SEMIC.EU approach. Retrieved from European Commission - Directorate-General Informatics:
<http://www.semic.eu/semic/view/documents/egov-core-vocabularies.pdf>
5. European Interoperability Framework (EIF) for European public services, European Commission, 2010, Available at:
http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf
6. Council conclusions inviting the introduction of the European Legislation Identifier (ELI). European Council (2012/C 325/02), Available at:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2012:325:0003:0011:EN:PDF>
7. Greek Interoperability Service Register, Available at:
[http://www.iocenter.eu/demos/service-registry-\(greek--english\).aspx](http://www.iocenter.eu/demos/service-registry-(greek--english).aspx)
8. Brickley D., Miller L., Available at: <http://xmlns.com/foaf/spec/>
9. Fælles Offentlig Referance Model (FORM), Available at: <http://blog.modernisering.dk/>
10. Functional Requirements for Bibliographic Records, International Federation of Library Associations and Institutions (IFLA), 1998, Available at:
<http://www.ifla.org/publications/functional-requirements-for-bibliographic-records>
11. Government Enterprise Architecture, See an overview at:
<http://wapps.islab.uom.gr/govml/?q=node/4>
12. Good Relations, the Web Vocabulary for eCommerce. M Hepp, Available at:
<http://www.heppnetz.de/projects/goodrelations/>
13. Accessing Member State information resources at European level, Available at:
http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-3action_en.htm
14. KL Emnesystematik, Local Governments Denmark, Available at: <http://www.kle-online.dk/>
15. The Local Government Business Model, ESD Toolkit 2010, Available at:
<http://standards.esd.org.uk/LGBM.aspx>
16. Core Location Vocabulary, EC/ISA Programme. Available at:
http://joinup.ec.europa.eu/asset/core_location/asset_release/core-location-vocabulary-100
17. Loutas N., Peristeras V., Tarabanis K., The Public Service Ontology: A formal model for describing domain specific semantics. In International Journal of Metadata, Semantics and Ontologies, vol. 6 (1), p. 23-34, 2011.
18. Loutas N., Lee D., Maali F. Peristeras V., Tarabanis K., The Semantic Public Service Portal (S-PSP). In Proceedings of 8th Extended Semantic Web Conference (ESWC 2011), 2011, Heraklion, Greece

19. Loutas N., Peristeras V., Tarabanis K., Towards a reference service model for the Web of Services. *Data and Knowledge Engineering*, vol. 70(9): 753-774 (2011)
20. Nationale Prozessbibliothek project, Available at: <http://www.prozessbibliothek.de/projektziel/>
21. An organization ontology, Dave Reynolds/W3C, Available at: <http://www.w3.org/TR/vocab-org/>
22. Registered Organization Vocabulary, Archer P. and Papantoniou A. (eds), Available at: <http://www.w3.org/TR/vocab-regorg/>
23. Core Business Vocabulary, EC/ISA Programme, Available at: https://joinup.ec.europa.eu/asset/core_business/description
24. Peristeras V. and Tarabanis K. (2008) "The Governance Architecture Framework and Models", chapter in Pallab Saha (eds.) "Advances in Government Enterprise Architecture" Hershey, PA: IGI Global Information Science Reference.
25. Process and Methodology for Developing Core Vocabularies, 2011, Available at: <https://joinup.ec.europa.eu/elibrary/document/isa-deliverable-process-and-methodology-developing-core-vocabularies>
26. Public Sector Concept Model, Under development by a consortium of UK government bodies lead by LeGSB, Available at: <http://www.pauldcdavidson.com/pscm/index.php?Action=ShowModel&Id=3>
27. Tags for Identifying Languages, A Phillips, M. Davis, ITEF, 2009.
28. SKOS Simple Knowledge Organization System, Reference. Miles, A, Bechhofer, S, W3C Recommendation 18 August 2009, Available at: <http://www.w3.org/TR/skos-reference/>
29. ESD Toolkit Service List 4, Available at: <http://doc.esd.org.uk/ServiceList/4.00.html>
30. INSPIRE Code list from theme "Utility and Governmental Services". Available at: http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_US_v3.0rc2.pdf (ref. section 5.3.4.1, pages 84-8)
31. Under development at AIIM (Association for Information and Image Management), Available at: <http://www.aiim.org/Research-and-Publications/Standards/Committees/StratML>
32. OASIS Transformational Government Framework, Available at: https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=tgf
33. Terse RDF Triple Language, Available at: W3C <http://www.w3.org/TR/turtle/>
34. Use Case 9 - Common Service Model, Peristeras V., Available at: http://www.w3.org/egov/wiki/Use_Case_9_-_Common_Service_Model
35. Vocabulario de trámites y servicios públicos, CTIC, Available at: <http://data.fundacionctic.org/vocab/infraestructuras/servicios.html>
36. Jian Yu, Quan Z. Sheng Jun Han, Yanbo Wu, Chengfei Liu, A semantically enhanced service repository for user-centric service discovery and management, 2011, Available at: <http://cs.adelaide.edu.au/~qsheng/papers/dke2012.pdf>
37. Languages Named Authority List, European Publications Office Metadata Registry, January 2013. Available at <http://publications.europa.eu/mdr/authority/language/>